

Center for Traumatic Brain Injury

**Purdue University
Indiana University School of Medicine**

in partnership with

**Dartmouth School of Medicine
Harvard Medical School
Richard L. Roudebush VA Medical Center
University of Utah
Tuskegee University
Deployment Medicine International**

Response to DOD TBI-MRC

Traumatic Brain Injury

- Signature injury of Iraq and Afghanistan conflicts
 - Est. 22% of casualties have TBI
 - Vietnam: 12-14% of combat casualties had TBI
 - Kevlar body armor and helmets have significantly improved survival rates
 - Vietnam: Mortality from brain injuries was 75% or more



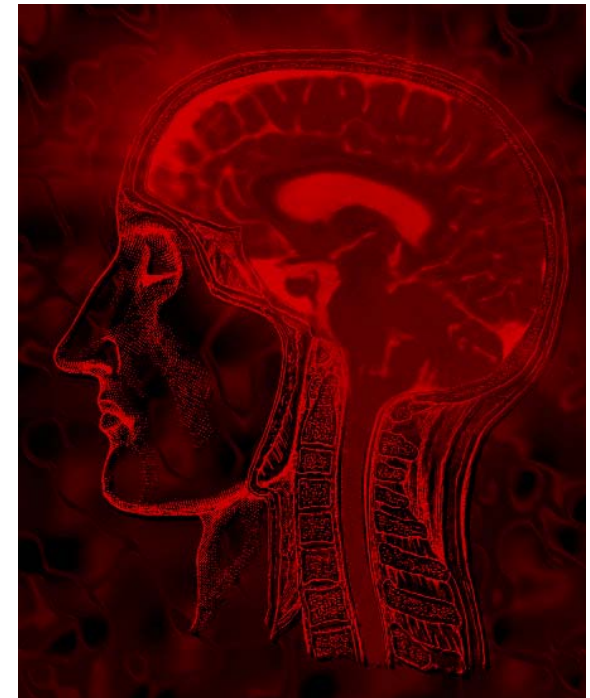
Symptoms of Traumatic Brain Injury

- Soldiers with TBI often have symptoms affecting several areas of brain function
- Headaches, sleep disturbances, and sensitivity to light and noise
- Cognitive changes such as disturbances in attention, memory, language and problem solving
- Behavioral symptoms such as mood changes, depression, anxiety, impulsiveness, emotional outbursts, or inappropriate laughter
- Some symptoms overlap those of post-traumatic stress disorder, many of have both conditions.



Civilian Traumatic Brain Injury

- Estimated 1.5 to 2.5 million civilian TBI cases per year in US
 - 50,000 cases fatal
 - 235,000 hospitalizations
- Exceeds all new cases of cancer
- Estimated \$60 billion in medical and indirect costs



Center for Traumatic Brain Injury

National Benefits of Establishing Center for Traumatic Brain Injury

- Prevention of traumatic brain injury
- Improved protective systems
 - *Personal*
 - *Vehicular*
- More accurate diagnosis of TBI
 - *Pinpoint locations of damage in the brain*
 - *Precisely determine extent of damage*
 - *Enable improved surgical and medical treatment protocols*
- Development of new drugs to treat TBI
 - *Agents to inhibit and repair acute neuronal damage*
 - *Agents to repair/reverse damage*
 - *Potential of PEG – potential to be first pharmacological treatment for TBI*
- Improved rehabilitation of TBI veterans (& civilians)
- National Resource for TBI Research and Treatment



Center for Traumatic Brain Injury

Indiana Benefits of TBI Center

Direct projected economic development impact

	<u>Econ impact (5 yrs.)</u>	<u>Econ impact (1 yr.)</u>
Total Life Science Funding	\$209.8 million	\$42.0 million
Federal Life Science Funding	\$162.5 million	\$32.5 million
New Direct Life Science Jobs	252 direct Life Science Jobs	
Indirect Jobs	1,217 Indirect Indiana Jobs	
New Disclosures (PU/IU)	118 disclosures	24 disclosures
New Patent Filings (PU/IU)	59 patents	12 patents
Spin Off Companies (IU/PU)	7.5 companies	1.5 companies

In addition, as Indiana becomes the national center for neurotrauma research and treatment, patients will travel from across the US to spend their insurance dollars in Indiana. This economic impact will be many times the direct impact given above.

Center for Traumatic Brain Injury

Institutional Partners

• Purdue University

- *Engineering: Impact and blast analysis and models*
- *Science: Large scale computer simulation*
- *Veterinarian science: Histopathology, imaging, animal models*
- *Biomedical engineering: Cellular mechanisms of damage and repair*



• Indiana Univ. School of Medicine

- *Neurological surgery: Preclinical and clinical trials on protection/recovery of CNS function*
- *IU Center for Neuroimaging: Preclinical and clinical studies of neurocognitive and brain functional outcomes*
- *Psychiatry: Research and clinical trials in anxiety disorders*
- *Physical medicine and rehabilitation, managing TBI and community re-integration*
- *Stark Neurosciences Research Institute: Biology of development and repair of brain and spinal cord*

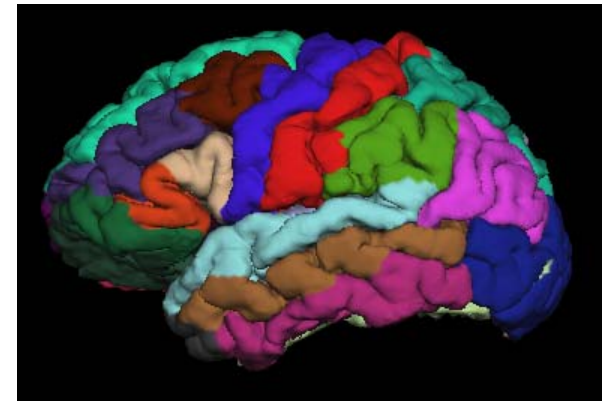


Center for Traumatic Brain Injury

Institutional Expertise

- Impact and blast physics
- Numerical simulation
- Advanced neuroimaging
- Basic neuroscience
- Development of pharmacological agents
- Clinical neurotrauma treatment
- Medical intervention
- Family care

*IU Center for Neuroimaging
Saykin , Shen, West et al.*



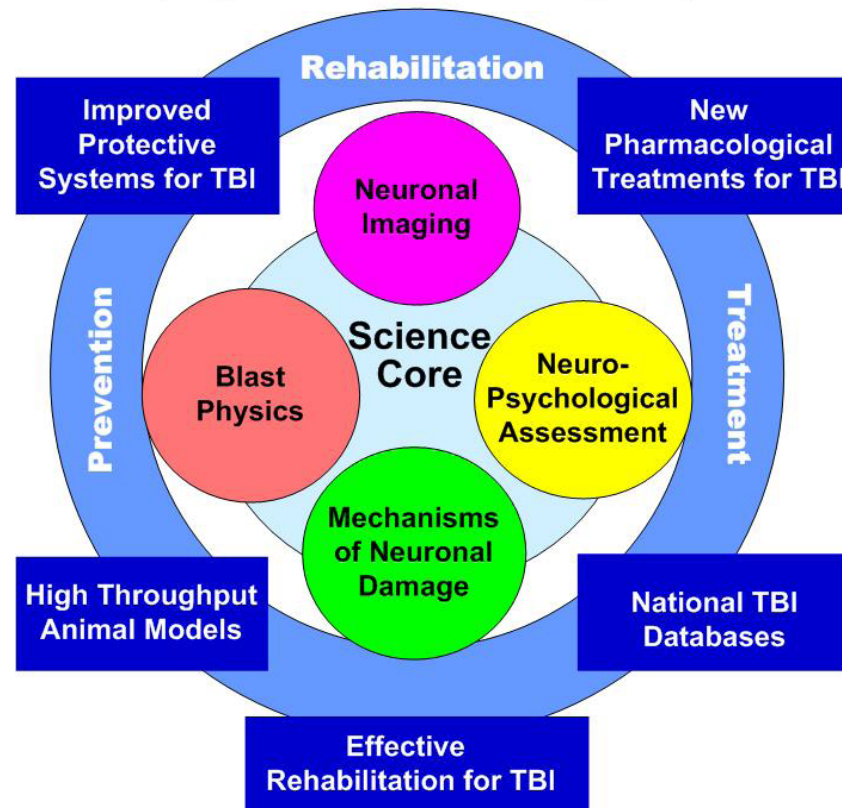
**First drug treatment for
TBI developed by team –
Phase I Clinical Trials**

***Only place in nation with this array of expertise, and
all within a one hour drive***

Center for Traumatic Brain Injury

Integrated Basic & Clinical Research Program

Integrated TBI Research Programs



Current Activities

- ***Proposal to the DoD TBI-MRC program to establish Center for Traumatic Brain Injury***
\$37M / 5 years from DoD for TBI research in Indiana
Purdue and IU Med School cost share an additional \$27M
Intense national competition

Letter signed by Gov. Daniels and Indiana congressional delegation supporting the Indiana proposal
- ***Establishing a Cooperative Agreement with Army Research Office***
ARL is main engineering and development organization in Army
Purdue/IU Med School/ARL will partner to walk into DoD Medical Command
Objective: premier provider of R&D at the medical-engineering interface
- ***Review-edit MURI proposal call from Army Research Office (ARO)***
Cellular and molecular basis for TBI
\$1M/year for 4 years
Preliminary research to make our proposal more competitive

Emerging Activities

Request to Indiana Congressional Delegation

- ***TBI Washington Project***

\$ 5M/year for 2 years to Purdue & IU Med School

***Phase 1: research in modeling of blast/impact
and advanced neuroimaging***

***Phase 2: research in cellular response to TBI
and new pharmacological treatments***

**Establish \$5M
Plus-up in the
2009 Budget**

- ***Establish DoD National Data Center(s) in Indiana***

TBI National Data Center + other DoD Centers

Locate in Merrillville at Purdue Research Park

***Leverage Congressional investment in Northwest
Indiana Computational Grid and the Merrillville
Research Park***

**Complete
hardware/software
infrastructure in
Merrillville via Plus-
up in 2009 Budget
+
Leadership in
establishing DoD
Data Center(s)**

Future Opportunities

- **Direct funding from the DoD**
 - *DoD Material Commands for soldier and equipment protection*
 - *DoD Medical Commands*
 - *VA Hospitals*
- **Civilian Neuro-trauma Injury**
 - *NIH*
- **Insurance Industry**
 - *More new cases of neuro-trauma than cancer every year*
 - *Life-long care for neuro-trauma injuries*
- **NCAA and Sports Medicine**
- **Race Car Industry**
- **Connection with Mascatuck and Crane for testing**
- **Industrial partnerships**
 - *new pharmacological agents for neuro-trauma*
 - *new protection devices for DoD and civilian use*

Ultimate Objective:

Indiana is the National Center for Neuro-trauma where patients from across the nation come here to spend their health care dollars